split multi-channel signal to each of the modules 15 under test (the first and second modules under test, it being understood that more than two modules 15 may be accommodated by the virtual oven 10 as explained above in relation to Figs. 1a and 1b).

Each of the modules 15 under test processes the multi-channel signal and sends the processed result to optical switch 135. The optical switch 135 is also connected to AMS controller 100 that controls which of the processed multi-channel signals are sent to the BERT processor 150. As further explained below in relation to the flowchart of Figs. 9a and 9b, AMS controller 100 controls optical switch 135 on a periodic basis in order to time-share the BERT processor 150 among the modules 15 under test.

Although the output from only one module 15 is analyzed at a time by BERT processor 150, it is still quite useful to feed all of the modules 15 of the logical group 30 with a multi-channel signal. The reason is that the multi-channel signal exercises the modules 15 more completely than simply providing power to the modules. In other words, each module 15 under test is actively processing the multi-channel signal that requires powering internal components such as lasers and thereby subjects each modules to a wider-range of functional testing and stress.

The BERT processor 150 performs a conventional bit error rate test of the multi-channel signal processed by the current module 15 under test. BERT processor 150 may be implemented with a variety of standard or specially designed test equipment capable of performing a bit-error rate test. The results of then bit error rate test are fed to AMS controller 100 for analysis and/or storage in database 40. The AMS controller 100 associates the particular bit error rate test with the current module 15 under test so that the database 40 may track the performance or failure of each module 15.

A graphical user interface (GUI) 160 is preferably connected to the AMS controller 100. GUI 160 allows an operator to view the test result, monitor the virtual oven 10 and control the virtual oven 10 in a manner more particularly described below. GUI 160 may be implemented with a conventional cathode ray tube, liquid crystal or other display technology. If a touch screen is utilized as illustrated in Fig. 5, then a separate input device is not necessary. Of course, separate input devices (not shown) such as a mouse or keyboard may be added so that an operator can interact and control the virtual oven(s) 10.

Fig. 6a illustrates another implementation of the virtual oven 10 has many similarities to the system shown in Fig. 5. As shown in Fig. 6a, a single SONET/SDH test equipment 125 is utilized instead of the BERT processor 150 and multi-channel signal generator 110 of Fig. 5. Moreover, the signals fed to the modules 15 under test are not necessarily DWDM or other multi-channel signals. Instead, any optical signal may be supplied by the SONET/SDH test equipment 125 via optical splitter 110 to conduct any desired optical test.

The optical signals processed by the modules 15 under test are supplied to the optical switch 135. AMS controller 100 controls optical switch 135 in the same manner described above in relation to Fig. 5 to time-share the SONET/SDH test equipment 125 between the plurality of modules 15 under test.

Fig. 6b illustrates another aspect of the invention. Namely, the virtual oven 10 illustrated in Fig. 6b permits passive testing of the modules 15. Passive testing includes self-monitoring by the modules in which test equipment included within (or added to) each module 15 may perform a test. For example, the passive test may be sensing the temperature of components such as a Bragg grating, laser diode, or other component. The

module 15 may include temperature sensor(s), voltage sensors, or other test equipment that conducts passive testing of module 15 components.

The passive test measurements or results thereof are supplied by the modules 15 to the AMS controller 100 as indicated by the signal line connecting these elements. The AMS controller associates the test measurement and/or results with the particular module 15 being passively tested and supplies this data to the database 40.

Fig. 6c is similar to Fig. 6b but illustrates that the invention may be generalized to modules 15 other than optical communications modules. Specifically, a generalized test equipment 25 is used instead of the application specific BERT processor 150 of Fig. 5 or the SONET/SDH test equipment 125 shown in Fig. 6b.

The generalized test equipment 25 illustrated in Fig. 6c may perform any desired electrical, optical, electro-optical or other test on the modules 15 by supplying a signal thereto via signal splitter 210. The signals processed by the modules 15 are then fed back to the test equipment 25 via switch 235. AMS controller 100 controls switch 235 on a periodic basis in order to time-share the test equipment 25 between the plurality of modules 15 under test.

Fig. 6d illustrates another alternative of the invention, which is to utilize switch 245 in place of the signal splitter 210 of Fig. 6c. This alternative is not preferred because it does not exercise all of the modules 15 under test to the same degree as when an active signal is fed to the module 15. However, it is possible to use a switch 245 instead of a splitter 210. The switch 245 is controlled by AMS controller 100 in the same fashion and, preferably, at the same timing as switch 235 so that the signals from test equipment 25 may be routed to a